REMARKS/ARGUMENTS

As a result of this Amendment, claims 13-16 are under active consideration in the subject patent application.

In the Official Action, the Examiner:

(1) withdrew the indication of allowability of claims 13-16, and rejected claims 13 and 15 under 35 U.S.C. § 103(a) in view of a proposed combination of U.S. Patent No. 6,397,935, issued to Yamamoto et al., with U.S. Patent No. 6,227,287, issued to Tanaka et al.; and

(2) rejected claims 14 and 16 under U.S.C. § 103(a) in view of a proposed combination of U.S. Patent No. 6,397,935, issued to Yamamoto et al., (possibly) U.S. Patent No. 4,274,479, issued to Eastman, U.S. Patent No. 6,227,287, issued to Tanaka et al. and U.S. Patent No. 6,536,510, issued to Khrustalev et al.

With regard to Item 1, Applicants traverse the Examiner's rejection of claims 13 and 15 under 35 U.S.C. §103, since the Tanaka et al., reference utterly fails to provide the teachings identified by the Examiner as missing from the Yamamoto reference. Reconsideration and withdrawal of the rejection under 35 U.S.C. §103 are requested for the following reasons.

The Examiner has admitted that the Yamamoto reference fails to disclose (i) posts being coated with a sintered wick powder, and (ii) a particle layer comprising less than about six average particle diameters. Applicants note that there is no suggestion of the powder coating of internal posts or particle layer

comprising less than about six average particle diameters found within the four corners of the Yamamoto reference. Thus it appears that the Examiner is relying solely upon the teachings of the Tanaka reference for the requisite motivation to combine references, and for the disclosure of a wick layer less than about six average particle diameters.

In order for a *prima facie* case of obviousness to be established, there must be some suggestion or motivation, either in the reference itself, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference must teach or suggest all of the claim limitations [emphasis add] (MPEP §2142). Applicants respectfully submit that nowhere within the four corners of the Tanaka reference is there disclosure or suggestion of a wick comprising a particle layer having less than about six average particle diameters.

More particularly, the Examiner references Tanaka's particle layer (206) as evidence that Tanaka suggests a particle layer having less than about six average particle diameters. This assertion is simply not supported by the disclosure in Tanaka. At col. 8, lines 10-17, Tanaka et al. describe their wick (206) as follows:

> ". . .The main wick 206 transports the refrigerant collected at the bottom of the tank 205 to the adjacent portion 206a by the capillary action, and is made of a porous metallic sintered body that is the same material, void content and void radius of the porous metallic sintered body 106 of the First embodiment. The porous metallic sintered body is formed from a porous material made of a metal having excellent heat conductivity (for example, copper..."

Thus the teachings relied upon by the Examiner reference a porous metallic sintered body that is the same material, void content, and void radius as the porous metallic sintered body 106. At col. 4, lines 20-29, Tanaka et al., teach:

> ". . . The porous metallic sintered body 106 has a predetermined void content and void diameter. Specifically, it is desired that the transportation portion has a void content of 50% or more and a void diameter within a range of 10-100μm to achieve high capillary action. It is desired that the adjacent portion 106a has a void content of 20% or more and a void diameter within a range of 10-100μm to reduce a superheat degree of the heating body mounting portion 107a.
>
> As described above, the porous metallic sintered body 106 is desired to be manufactured so that each of the transportation portion and the adjacent portion 106a has suitable void content to have both a wick function and a superheat degree reducing function. The porous metallic sintered body 106 can be manufactured by the following method for instance. First, a porous metallic sintered body 106 having a void content of 50% or more and a void diameter of within a range of 10-100μm is manufactured. Metallic particles or the like are buried in only the adjacent portion 106a, and then the adjacent portion 106a is sintered so that its void content is set to 20% or more. In this way, the porous metallic sintered body 106 comes to have both the wick function and the superheat degree reducing function. . . ."

Tanaka et al., teach that a void content of 20% and a void diameter of within a range of 10-100μm are essential to their wick. However, nowhere does Tanaka ever discuss an average particle diameter, nor do they ever suggest a structure for their wick including at least two spaced-apart lands that are in fluid communication with one another through a particle layer disposed between those

lands that comprises less than about six average particle diameters. Moreover, Tanaka et al. teach that to form their wick, metallic particles or the like are buried in only the adjacent portion 106a, and then the adjacent portion 106a is sintered so that its void content is set to 20% or more. Tanaka never once discusses or suggests an average particle diameter or, even more significantly, a number of average particle diameters that will constitute the layer of sintered material. Thus the supposed teachings of Tanaka relied upon by the Examiner to support the proposed combination do not exist in that reference.

Applicants respectfully submit that, in light of the foregoing actual teachings from the Tanaka reference, and when combined with the Examiner's own admission that Yamamoto fails to teach or suggest a particle layer comprising less than about six average particle diameters, the Examiner has failed to establish a *prima facie* case of obviousness. Applicants' invention, taken as a whole, including its structure, its properties, and the problems it solves cannot be properly found within the combined teachings of the Yamamoto and Tanaka references. Moreover, when the teachings of these references are combined as suggested by the Examiner, and taken as a whole, there is simply no suggestion or motivating disclosure provided to direct one of ordinary skill to the claimed structure, absent impermissible hindsight on the part of the Examiner. Specifically, the combined teachings of Yamamato and Tanaka suggest a flat heat pipe, having internal posts, with a sintered metal wick whose void content and void diameter are closely controlled to be within specified limits.

It is a clear error to reject a claimed invention as an obvious combination of the teachings of two prior art references when the prior art provided no teaching, suggestion, or incentive supporting the combination. In re Bond, 910 F. 2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990).

Accordingly, claims 13 and 15 are allowable over the proposed combination of Yamamoto and Tanaka. Applicants request reconsideration and withdrawal of the rejection of claims 13 and 15 under 35 U.S.C. §103.

With regard to Item 2, in the Official action the Examiner references a combination of the Yamamoto reference with U.S. Patent No. 4,274,479, issued to Eastman, "*as applied above.*" However, the Examiner did not rely upon a combination of Yamamoto and Eastman prior to this point in the Official action, instead it was a combination of Yamamoto and Tanaka. Nevertheless, neither combination when taken alone or when further combined with the teachings in the Khrustalev reference render claims 14 and 16 obvious. Reconsideration is requested for the following reasons.

Applicants have established hereinabove that the combination of Yamamoto with Tanaka fails to teach or suggest, in any way, an average particle diameter or a particle layer having less than a specified number of average particle diameters. The Khrustalev reference appears to have been combined with Yamamoto and Tanaka by the Examiner to provide missing teachings relative to a sintered grooved wick layer (64) and by alleging six average particle diameters is within a range from about .005 millimeters to about .5 millimeters

(citing col. 6, lines 51-54 of the Khrustalev reference in support of this allegation). A review of the Khrustalev reference yields no such disclosures whatsoever.

At col. 6, lines 51-54, Khrustalev discloses:

> ". . . Capillary wick 64 may comprise adjacent layers of screening or a sintered powder structure with interstices between the particles of powder. In one embodiment, wick 64 may comprise sintered copper powder, aluminum-silicon-carbide (AlSiC) or copper-silicon-carbide (CuSiC) having an average thickness of about 0.1 mm to 1.0 mm. . . ."

Khrustalev never once discusses or suggests an average particle diameter or, even more significantly, a number of average particle diameters that will reside in the layer of sintered material that forms his wick (64). Instead, Khrustalev discloses an average thickness of the entire wick layer as being in a range from about 0.1 mm to 1.0 mm, and not a range from about .005 millimeters to about .5 millimeters as stated by the Examiner. Moreover, Khrustalev never teaches or suggests that his wick layer should be disposed between at least two spaced-apart lands and comprise less than about six average particle diameters. Thus the supposed teachings of Khrustalev relied upon by the Examiner to support the proposed combination do not exist in that reference.

As to the Eastman reference, and to the extent that the Examiner intended to rely upon its teachings, if at all, it too fails to teach or suggest the present invention alone or in any valid combination with Yamamoto, Tanaka, or Khrustalev. More particularly, at col. 4, lines 8-23, Eastman teaches an example of his sintered grooved wick as follows.

> ". . . One embodiment of the invention is a heat pipe formed of an oxygen-free copper shell one-half inch in diameter and 24 inches long with a wall 1/32 inch thick. An oxidized stainless steel mandrel 3/8 inch in diameter with 12 grooves 0.05 inch deep and approximately 0.05 inch wide is centered within the outer shell, and the spaces between the mandrel and outer shell are filled with fine copper powder such as AMAX Type B powder. The assembly is then fired in an atmosphere of humidified hydrogen for one hour at 900.degree. centigrade. The mandrel is removed, leaving a grooved wick consisting of copper powder sintered to approximately 48% of the theoretical density. The heat pipe ends are then closed, the working fluid inserted and the heat pipe vacuum processed and sealed by means well known in the art. . . ."

Following Eastman's prescription, a wick layer (34) is formed between lands that is no less than 0.030 inches thick. This thickness far exceeds the less than about six average particle diameters defined by Applicant's claims. More particularly, Eastman teaches an outer diameter of his heat pipe of .5 inches and a heat pipe wall thickness of 1/32 inch or .032 inches. Therefore the inner diameter of his heat pipe will be equal to .5" - (2 x .032") which equals (.5" - .064") or .436 inches. Eastman then teaches a mandrel diameter of 3/8 inch or .375 inches. Thus Eastman's wick thickness is equal to one-half of the difference between the heat pipe inner diameter (.436 inches) and his suggested mandrel diameter (.375 inches) or .030 inches which is well outside the ranges claimed by Applicant. When combined with the teachings of Tanaka, Yamamoto, and Khrustalev, a wick layer for a heat pipe of about .030 inches thickness would be suggested that has a specified void content and a specified void diameter, but that could not be less than six average particle diameters.

Since nothing in these prior art references would lead a person of ordinary skill in the art to design an apparatus like that described in the application, or defined by claims 13-16, it appears that hindsight knowledge of the present invention is the only motivation to combine these references. In particular, none of the references relied upon by the Examiner teach or suggest a particle layer disposed between lands of a sintered grooved wick that comprises less than six average particle diameters. Applicant respectfully submits that the motivation to combine references cannot come from the invention itself. See, In re Oetiker, 24 U.S.P.Q. 2d 1443, 1446. An Examiner commits clear error when rejecting a claimed invention as an obvious combination of the teachings of two prior art references when the prior art provided no teaching, suggestion, or incentive supporting the combination. In re Bond, 910 F. 2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990)

In summary, Applicants submit that the unique apparatus defined by claims 13-16 is not disclosed in the prior art references, taken as a whole, and there is no teaching or suggestion in the references to support their use in the particular claimed combinations. In the absence of such, the references are improperly combined. In any event, claims 13-16 define over the various proposed combinations of Yamamoto, Tanaka, Khrustalev, or Eastman.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

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Docket No.: H1799-00187
Reply to Office Action dated 09/09/2004

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicants' undersigned Attorney invites the Examiner to telephone him at **717-237-5516**.

Respectfully Submitted,

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